DOCUMENT RESUME

ED 322 128 SP 032 519

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TITLE A Study of Expert and Novice Teacher Decision Making: An Integrated Approach.
PUB DATE Apr 90
NOTE 23p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Techniques; *Cooperating Teachers; *Decision Making; Elementary Secondary Education; Lesson Plans; *Student Behavior; Student Characteristics; *Student Teachers; Teacher Response; *Teacher Student Relationship; Teaching Experience

ABSTRACT

The thinking and decision making of expert and novice teachers were studied during three stages of teacher decision making: (1) preactive or planning, (2) interactive or actual teaching, and (3) postactive evaluation and reflection. The novices were five student teachers and the experts were their five cooperating teachers. Differences found between the thinking and decision making of the expert and novice teachers most notably involved the areas of integration of knowledge, student behavior, and interaction among the stages of decision making. The experts demonstrated an ability to combine or integrate new information with prior knowledge, and they were constantly aware of behavioral cues from students telling them when to change their approach to maintain the flow of the lesson. The mental representations of the expert teachers appeared to be based on a comprehensive view of the classroom so that during the preactive stage they used many types of information, such as knowledge of the overall curriculum, the subject matter, and students' interests to arrive at internal goals for their lessons. The methodology of the study has implications for both teacher education and professional development of experienced teachers. Videotaping and conferencing can foster insights into decision making that are unavailable through more traditional methods. The increased awareness of teaching strategies and how best to use them could aid both expert and novice teachers in planning and conducting lessons which facilitate student learning. (JD)

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A STUDY OF EXPERT AND NOVICE TEACHER DECISION MAKING: AN INTEGRATED APPROACH

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April, 1990

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A STUDY OF EXPERT AND NOVICE TEACHER DECISION MAKING: AN INTEGRATED APPROACH

Twenty years ago we didn't know much about what happened in classrooms. But today, a growing body of research from various theoretical perspectives focuses on the nature of expertise in teaching. The results of this research reveal what classroom teachers have always known, namely that teaching is an extremely complex and cognitively demanding activity (National Institute of Education, 1975). One approach to exploring the nature of this complexity, with the possibility of more fully understanding the nature of expertise in teaching, is to study the distinctions which exist between expert and novice teachers. The study reported in this article examined the thinking and decision making of expert and novice teachers during three stages of teacher decision making: preactive or planning, interactive or actual teaching, and postactive evaluation and reflection. The novices were five student teachers and the experts were their five cooperating teachers. All lessons were taught in natural classroom settings. Qualitative analysis methodologies provided rich in-depth descriptions of each teacher's thinking and decision making before, during, and after teaching lessons in a variety of subject areas.

Background

Shulman (1987) suggested that teachers must comprehend and transform knowledge in order to teach effectively; this involves pedagogical decision making. The present study examines how the comprehension and transformation of knowledge differs for expert and novice teachers and how these differences affect the teachers' pedagogical decision making.

The theoretical background for this study emerged from a growing body of research on the cognitive processes of teachers (For a review see Clark and Peterson, 1986). However, the organization and categorization of this body of knowledge has not yet been clearly defined, with the result that research findings sometimes appear to be conflicting and inconclusive. Research in this vital area is important since teachers' thinking and decision making organize and direct their behavior, thus providing the context for student learning. Decision making is a prime area for studying the cognitive processes of teachers since decision making is involved in every aspect of a teacher's professional life. In fact, Shavelson (1973) early asserted that if there is one basic teaching skill, it is decision making. He later added that because of the complexities of the classroom, the number of decisions a teacher makes is infinite (Shavelson, 1976).

At the present time, we know too little about the nature of expertise in teaching. Where, when, and how do teachers acquire the ability to make sound decisions? In the complex environment

of classrooms, what sources of information do experts and novices use when making decisions about teaching? Slowly but surely, light is being shed on the puzzle of teaching expertise. In 1981, Shavelson and Stern presented a model of teacher decision making that attempted to show how teachers integrate information about students, subject matter, the classroom and school environment, and other factors in order to make decisions on which their behavior is based. Since that time, there has been general agreement that a successful teacher must develop expertise in both pedagogical and content knowledge. Furthermore, these forms of knowledge must be integrated and interactive in order for the teacher to be successful (Berliner, 1986). Calderhead (1983) noted that expert teachers carry out decision making in the context of information-rich schemas which allow them to perceive and interpret the complexities of the classroom in meaningful ways. He makes a clear distinction between the ways in which expert and novice teachers mentally represent classroom situations. Teachers' mental representations are important since they will influence all further decision making and thus drive teaching performance. Shulman (1987) suggested that a teacher's mental representation of a lesson is a bridge linking the teacher's understanding of the lesson content to the learning of the students.

In an investigation similar in design to the research reported here, Borko and Livingston (1989) examined the nature of expertise in teaching by comparing the planning, teaching,

and reflections of student teachers and their cooperating teachers. They report that novices are less efficient when planning, encounter problems when classroom events take them away from their scripted lesson plans, and are not as selective in their reflections as expert teachers. These authors attribute the differences they found to the assumption that novice teachers' cognitive schemas are less elaborate, interconnected, and accessible than those of expert teachers. Gagne (1985) and Gage and Berliner (1984) note that because of less well-elaborated schemas, novices in any field lack the metacognitive or monitoring skills that experts in the field possess. These skills allow expert teachers to know when and how to apply what they know to classroom situations, in other words, to recognize and use available information in a meaningful way.

Berliner (1988) found that expert teachers spend more time planning lessons than novices. He suggests that during planning, novice teachers may form mental representations of their lessons which are too narrow or incorrect. This can lead to serious problems during actual teaching. Parker and Gehrke (1986) assert that a mental representation is formed by preactive planning which, during actual teaching, acts as a guide to move the lesson forward while interactive decision making allows the teacher to adapt the plan to students' needs.

Method

Jackson (1968) categorized teacher decision making as occurring in three stages: preactive or planning, interactive or actual teaching, and postactive or evaluation and reflection after teaching. All three of these stages were used in setting up the design of the present study in answer to a call by Clark and Peterson (1986) for an integrated approach to research on teaching.

All lessons were conducted in the actual classrooms of the teacher subjects at a public elementary school in suburban Maryland. Data was collected in four phases for each lesson. For the preactive stage, each teacher was interviewed before teaching a lesson to determine what decision making had gone into her planning. Written lesson plans were a university requirement for student teachers but none of the experts wrote out their plans. For the interactive stage, or actual teaching, the lesson was videoptaped. Shortly after the completion of the lesson, a stimulated recall interview was conducted in the following way: the videotape of the lesson was played back in its entirety and the teacher was instructed to stop the tape each time she remembered making a decision and explain the thinking that went into the decision. Immediately after this, the teacher was asked questions designed to elicit postactive evaluation and reflection. The fourth component of the data collection process occurred several months later when a self-report was conducted in order to capture any thinking and

decision making that had not been reported during the initial interviews as well as any changes in thinking on the part of the teachers.

All interviews and videotapes were transcribed, providing a large quantity of information-rich data. Additional data included prescribed school system curriculum guidelines, classroom handouts, students' work, and field notes taken during the actual teaching of the lessons. Qualitative analysis of this data followed a technique developed as a modification of the constant comparative method of Glaser & Strauss (1967). (For details of analysis see Westerman, 1989.) This inductive approach promotes the achievement of theory that is grounded in the data. The analysis of this data from a wide variety of data sources provided a multidimensionality which led to confidence in forming hypotheses about teacher cognition and decision making.

Results and Discussion

The results of this analysis revealed important distinctions between the thinking and decision making of the expert and novice teachers most notably involving the areas of integration of knowledge, student behavior, and interaction among the stages of decision making. Each of these three important areas requires further explanation.

Integration of Knowledge

Integration of knowledge involves combining or integrating new information with prior knowledge; this is recognized as an essential part of any learning. When planning lessons, the expert teachers in this study performed a cognitive analysis for the learning task. That is, the experts, with their knowledge of the overall curriculum, made planning decisions based on related content knowledge their students had been exposed to during previous years in school as well as how much of that knowledge students could be expected to have retained. For example, "I decided to tie this lesson to what we had discussed earlier in the year." The cognitive analysis, along with the teacher's knowledge about her students' abilities, learning styles, and interests formed the basis for her planning. Integration of knowledge also involves relating current lesson content with other subjects in the curriculum. For example, while reflecting on her teaching of a Social Studies lesson an expert teacher explained, "I mentioned the hero to tie in an activity that we had done last writing lesson which was to write an adventure story featuring a hero or heroine." This awareness on the part of expert teachers is important because it allows them to place new learning within the context of prior knowledge and allows students to see where the present lesson fits in with what they already know. Evidence from research in cognitive psychology suggests that contextualizing new information in this way can facilitate student learning (Sternberg, 1981).

Novice teachers, on the other hand, had neither enough knowledge of the overall curriculum nor awareness about student characteristics to allow them to perform an adequate cognitive analysis for the lessons they were planning. Novices rarely mentioned integrating the present lesson with prior knowledge as the experts had during their preactive interviews. Instead, when planning lessons, the novices relied on the one thing they knew about, and indeed felt accountable for, that is, the grade-level curriculum objectives prescribed by the county public school system. During the preactive interviews, most novices explained their planning by saying something like, "I just had to make sure they met all the objectives." While the expert teachers used the curriculum guidelines in an interpretive way according to the needs of their students, the novices used the same guidelines in a more literal way. The planning of the novice teachers indicated that they did not have a well-developed theory of instruction nor an overview of student learning in a subject area but instead planned each lesson as a discrete entity based on the prescribed objectives.

The distinction between expert and novice teachers regarding integration of knowledge became even more obvious during actual teaching. At the very beginning of their lessons, the expert teachers reviewed relevant information. They frequently began with the words, "Remember when we learned about ...." This simple strategy provided the teacher with valuable information about how much of the topic the class remembered

and, therefore, where to start. For the students, it brought the topic and relevant information to short term memory and provided a framework for new learning. As their lessons progressed, the expert teachers carefully integrated the present learning with the students' prior knowledge. For example, one expert teacher explained, "That was to clarify for the kids that subjects are interrelated. Things aren't in isolation." The lessons of the expert teachers were often recursive since they constantly doubled back to repeat a point, relate new information to prior knowledge, and assess their students' understanding. "That's a decision to go back and repeat the idea so that they know this is a focal point, this is what you have to listen for, this is what we're dealing with." Furthermore, before going on to a new point, these teachers summarized what had been discussed and set the stage for what was coming next.

The novice teachers, on the other hand, often started their lessons more or less in a vacuum without recalling prior knowledge about the topic of the lesson: "Today we're going to talk about consonant blends." As their lessons progressed, novices did little to relate present learning to past or future learning. Furthermore, the novices did not summarize information or set the stage for new learning at transition points in the lesson as the experts did. This failure on the part of novice teachers to contextualize subject content information can have an important effect on student learning,

particularly for those students who are unable to independently provide a framework for new knowledge. For these students, new knowledge may not be encoded and stored in memory in a well-organized way that will allow it to be retrieved efficiently at appropriate times. This is important for teacher education because, unlike some aspects of expertise, teaching in a way that facilitates integration and organization of knowledge involves a set of skills which can be taught to education students.

Student Behavior

That student behavior is the primary focus of novice teachers' attention will come as a surprise to no one. But while there can be several reasons for this preoccupation on the part of the novices, what was of special interest to this study was the way expert and novice teachers thought about student behavior and what decisions each group made regarding it.

When off-task behavior, such as talking or inattentiveness, occurred during an expert teacher's lesson, she brought the offending child back into the mainstream of the lesson by a look, calling on the child, or using some other strategy from her repertoire of management techniques. This usually got the child involved again and gave the child a new opportunity to learn without disrupting the lesson for other class members. As the lessons of expert teachers progress, they are constantly aware of behavioral cues which tell them when to change their

approach. For example, one expert teacher reported, "I wanted to get them moving because they were getting antsy." Expert teachers use their voices and body language along with management strategies to motivate students and control their attention. During the stimulated recall interviews, the expert teachers usually mentioned some reason for the behavior such as, "Reading is hard for Jimmy and that's why he can't sit still". In other words, the experts seemed to see causal relationships between the underlying reasons and the child's behavior.

When off-task behavior occurred in the novice teachers' classrooms, it was usually ignored at first. When it became very obvious, sometimes to the point of disrupting the class, the lesson usually came to a screeching halt while the child was punished in some way, either by a glare, being scolded, or, as happened in one case, being sent out of the room and into the hall. This usually resulted in turning the offending child off for the remainder of the class and could be harmful for the learning of the other children as well since a group of studies has demonstrated that student achievement is higher in classes where a smooth flow of instruction is maintained (Emmer, 1982; Emmer, Evertson, & Anderson, 1980; Evertson & Anderson, 1978). Novice teachers did not adapt their lessons even when the children became very restless from being too long at a task. As one novice reported, "I had my lesson plan and I just wanted to get to every part of it and get it finished." During the stimulated recall interview, the novices commented on student

behavior and usually blamed the students for bad behavior without giving any underlying reasons for their actions. For example, one novice commented, "They were very rowdy and all talking at the same time" without offering any possible reasons for the behavior.

Interaction of the Three Stages of Decision Making

Evidence from the data in this study suggests that both expert and novice teachers formed mental representations of their lessons. For the expert teachers, the three stages of decision making, preactive, interactive, and postactive, were dynamically interrelated and this allowed a wide range of possibilities during teaching. The mental representations of the expert teachers appeared to be based on a comprehensive view of the classroom so that during the preactive stage, they used many types of information such as knowledge of the overall curriculum, subject matter, and students' interests to arrive at internal goals for their lessons. Because the experts were able to predict possible problems, these goals contained contingency plans in case the lesson didn't go as planned. One expert teacher explained, "I'm not sure how much information they will have (about the topic). If they know a lot already, then the lesson will go very quickly. If they don't know a lot, then I'm going to have to give them information from these books and pictures I got from the library." For the experts, the interactive stage, or actual teaching, was driven by their

internal goals formulated during planning. But as they were teaching, the expert teachers constantly assessed what was going on in their classrooms and adapted their lessons accordingly. For example, one expert teacher reported, "That was a decision to go with their ideas and not force them into what I thought they were going to do." Student reactions encountered during teaching caused the experts to modify their preactive decisions to fit the current classroom situation while still moving the lesson forward to the attainment of their goals. The expert teachers often accomplished this by using well-practiced productions or routines. This led to highly interactive lessons with students and teacher having equal parts to play. Comments made during the stimulated recall interviews indicated that the expert teachers felt free to deviate from their plans to discuss or review when needed because they knew just where the lesson was going. For example: "I think it's important to be open-ended with kids. I don't care if the lesson doesn't go exactly the way I planned as long as I know where we're heading."

During the postactive interviews, the experts evaluated their lessons according to how well they had achieved their internal goals in regard to the needs of their students. So for the expert teachers, because their mental representations were so comprehensive, planning did not seem to constrain what happened during their lessons.

For the novices, the three stages of decision making seemed more linearly related. They did not have the comprehensive view of the classroom which the experts did and this restricted their mental representations. The narrow focus of their preactive planning, based on the curriculum objectives, seemed to act as a limitation on what went on in the classroom. During actual teaching, the novices stuck closely to their lesson plans, sometimes ignoring students who brought up interesting points for discussion. As one novice put it, "I just didn't know enough about the topic to discuss it freely. I just wanted to stay close to my lesson plan and get it all done." In this way, the novices used their highly restricted lesson plans to limit the range of discussion to what they knew. Another novice teacher commented, "I didn't know what I'd do if someone brought up a point that was different from the answer I had but was also correct." During postactive interviews, the novices evaluated their lessons according to two things: whether they had achieved the prescribed objective and how the students had behaved. The novices simply did not have available to them the many forms of information that the experts did and, therefore, formed narrow mental representations of their lessons which seemed to restrict their classroom interactions. Rather than adapting their lesson plans when cues from students warranted it, the novices seemed determined to carry out their plans, sometimes in spite of anything that happened during the lesson.

In conclusion, this study revealed that important distinctions exist between the teaching of expert and novice teachers. The experts' mental representations leading to their internal goals were based on a much more comprehensive view of the classroom than the constrained views of the novices. This was played out during actual teaching in experts' lessons which were constantly adapted to cues from the students and were highly interactive. In contrast, the lessons of the novices were tightly constrained by the restricted nature of their lesson plans which they insisted on carrying out, along with their lack of information-rich schemas for children and well-practiced routines for classroom management. Furthermore, during actual teaching, expert teachers seemed to focus their attention on students and their learning while the novices seemed to focus on themselves and their own performances.

Implications for Teacher Education

The results of this study have important implications for teacher education. Although insights into the nature of expertise do not always provide information which can be applied in a prescriptive way to novices, this study clearly demonstrates that some areas of expertise in teaching involve skills which can be taught to education students. Knowledge and understanding of the distinctions between expert and novice teachers, explicated by naturalistic studies such as this, can enable teacher educators to intervene in effective ways during

university coursework and student teaching.

For example, education students can be taught to plan lessons in an integrative way using an overview of the curriculum rather than simply considering the objectives of the lesson they are about to teach. They can be taught to think of learning as a sequence of componential but interrelated skills rather than discrete bits of information. With this knowledge, they can learn to assess the prior learning of their students and then build lessons which will help students to integrate new information with old knowledge. These procedures have the potential for giving novices more of the global view of teaching from which the expert teachers seem to operate.

During actual lessons, novice teachers can be asked to look for causes underlying inattention or off-task behavior. They can be directed to monitor students for cues which lead them to use their lesson plans in an adaptive way rather than following their plans so closely that they constrain classroom interaction. Student teachers should be required to plan alternative ways to teach the same topic and to predict and plan for possible problems with their lessons.

During the postactive stage, novice teachers can be taught to reflect on their lessons using a broader scope of evaluative information than simply whether they fulfilled the objectives and the students "behaved". In this study, both the postactive interview and the delayed self-report seemed effective in promoting teacher reflection and allowing teachers to better

understand their thinking and decision making.

The methodology used for collection of the data in this study has important implications for both teacher education and professional development of experienced teachers. The integrated approach used here involved conferencing, videotaping, watching and discussing their videotaped lessons. Student teachers could work closely with cooperating teachers and university personnel using this methodology to examine their own teaching and the teaching of other novices and experts. These procedures can foster insights into decision making which are unavailable through more traditional methods. The increased awareness of teaching strategies and how best to use them could aid both expert and novice teachers in planning and conducting lessons which facilitate student learning. Evidence for the value of this methodology in promoting teacher reflection came at the end of one expert teacher's session, when she reported, "This (set of procedures) really made me think things through; it forced me to think about my ideas and philosophies and forever changed the way I taught after this process ended."

This study raised a number of questions which need further investigation. Evidence in the data indicated that planning seems to constrain classroom interaction for novices but not for expert teachers. What factors enter into this phenomenon? How are these constraints related to the limitations of the human information processing and the teachers' mental representations of classroom lessons.

Individual differences, which occurred among the expert teachers in this study as well as between novices and experts, provide evidence that experience alone cannot be equated with expertise. Further research should examine the relationship of experience and expertise in the professional development of teachers.

This report does not imply that every student teacher will immediately become an expert simply by warning them to watch out for the pitfalls brought out by this research. As Mayer (1987) asserted, "There is no shortcut to becoming an expert in a professional field." Rather, systematic teaching of sound decision making during coursework and student teaching can facilitate the development of effective teaching skills which will, in turn, facilitate the development of expertise.

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